

Application Filing Date: December 9, 2003

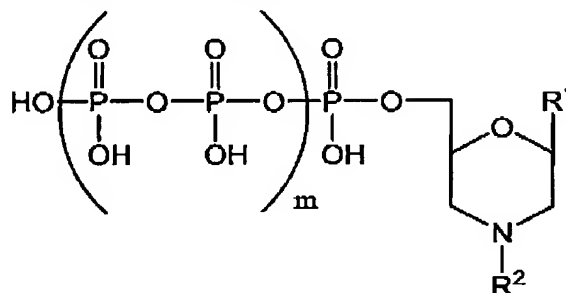
Attorney Docket No. 025219-442  
Page 2 of 6**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

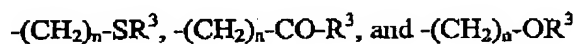
**Listing of Claims:**

Claim 1 (Canceled).

Claim 2 (New): A morpholino-nucleotide of the formula:



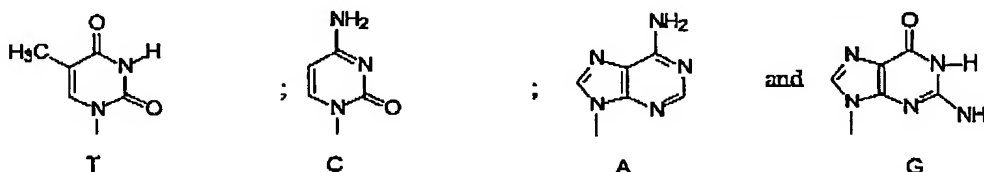
wherein  $R^1$  represents a nucleic base,  $m$  is 0 or 1, and  $R^2$  is selected from the group consisting of:



in which  $n$  is an integer ranging from 1 to 12 and  $R^3$  is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

Claim 3 (New): The morpholino-nucleotide of claim 2 wherein  $R^1$  is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 4 (New): The morpholino-nucleotide of claim 2 wherein  $R^1$  is selected from the group consisting of:



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Claim 5 (New): The morpholino-nucleotide of claim 2 wherein  $R^3$  is a label selected from the group consisting of radioactive products, luminescent products, electroluminescent and fluorescent products, and enzymatic labels.

Claim 6 (New): The morpholino-nucleotide of claim 5 wherein  $R^1$  is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 7 (New): The morpholino-nucleotide of claim 2 wherein  $R^3$  is a fluorophore.

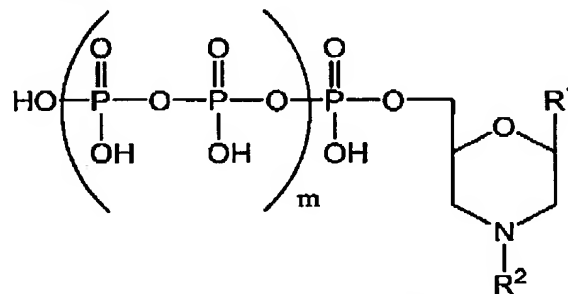
Claim 8 (New): The morpholino-nucleotide of claim 7 wherein  $R^1$  is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 9 (New): The morpholino-nucleotide of claim 2 wherein  $R^3$  is selected from the group consisting of fluorescein, biotin, and rhodamine.

Claim 10 (New): The morpholino-nucleotide of claim 9 wherein  $R^1$  is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 11 (New): The morpholino-nucleotide of claim 2 wherein  $m$  is 0.

Claim 12 (New): A morpholino-nucleotide of the formula:

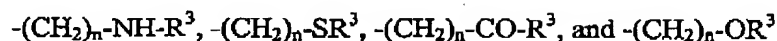


wherein  $R^1$  is a natural nucleic base selected from the group consisting of guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine;  $m$  is 0 or 1; and  $R^2$  is selected from the group consisting of:

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in which  $n$  is an integer ranging from 1 to 12 and  $\text{R}^3$  is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

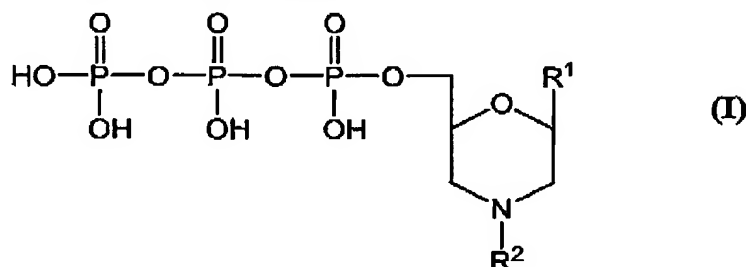
Claim 13 (New): The morpholino-nucleotide of claim 12 wherein  $\text{R}^3$  is a label selected from the group consisting of radioactive products, luminescent products, electroluminescent and fluorescent products, and enzymatic labels.

Claim 14 (New): The morpholino-nucleotide of claim 12 wherein  $\text{R}^3$  is a fluorophore.

Claim 15 (New): The morpholino-nucleotide of claim 12 wherein  $\text{R}^3$  is selected from the group consisting of fluorescein, biotin, and rhodamine.

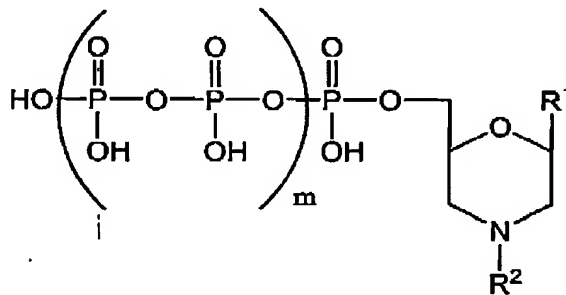
Claim 16 (New): The morpholino-nucleotide of claim 12 wherein  $m$  is 0.

Claim 17 (New): A morpholino-nucleotide of formula I:



wherein  $\text{R}^1$  is a nucleic base selected from the group consisting of adenine, guanine, cytosine, and thymine;  $\text{R}^2$  is  $-(\text{CH}_2)_4\text{-NH-R}^3$ ; and  $\text{R}^3$  is  $-\text{C}(\text{S})\text{-NH-fluorescein}$ .

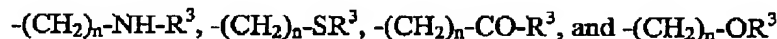
Claim 18 (New): A morpholino-nucleotide of the formula:



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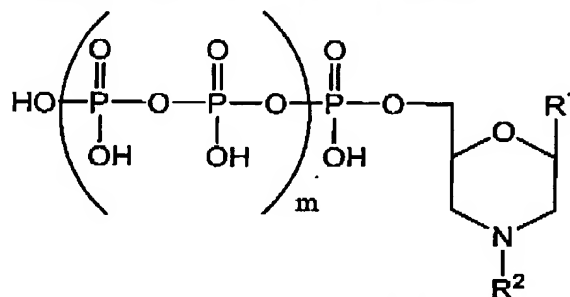
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wherein  $R^1$  represents a nucleic base,  $m$  is 0 or 1, and  $R^2$  is selected from the group consisting of:

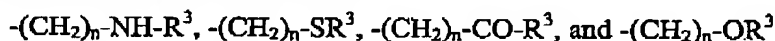


in which  $n$  is an integer ranging from 1 to 12 and  $R^3$  is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

Claim 19 (New): A morpholino-nucleotide of the formula:



wherein  $R^1$  is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine;  $m$  is 0 or 1; and  $R^2$  is selected from the group consisting of:



in which  $n$  is an integer ranging from 1 to 12 and  $R^3$  is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.